

# TELECOMMUNICATIONS



March 2024

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# Executive summary

## 2. RISING PENETRATION RATE

- Telecom penetration, also known as tele-density, has grown rapidly over the last few years.
- Tele-density increased from 18.23% in FY16 to 84.51% in FY24.
- As of December 2023, tele-density stood at 85.23%.

## 1. SECOND-LARGEST SUBSCRIBER BASE

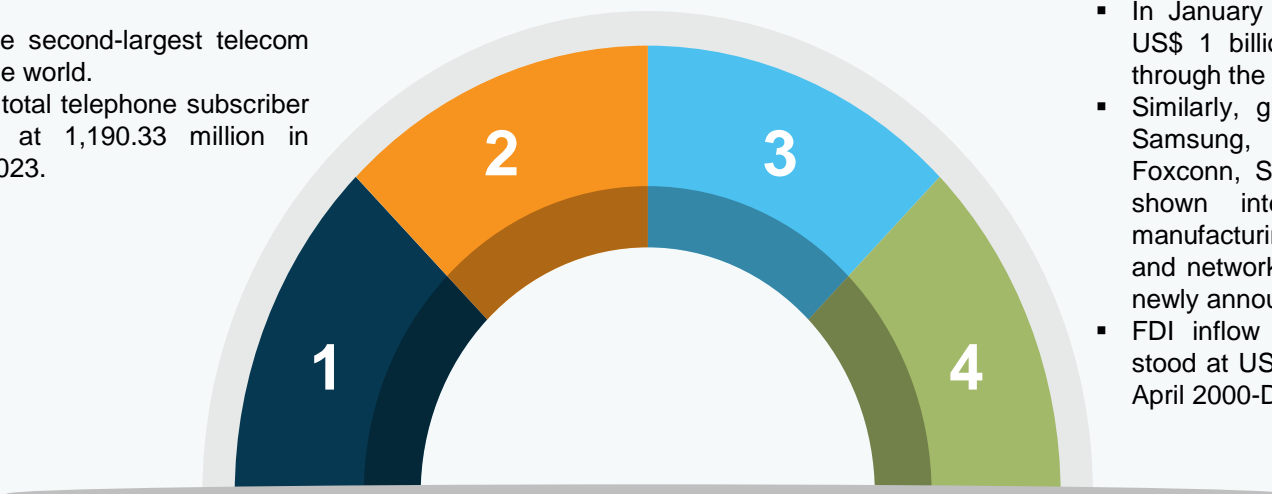
- India has the second-largest telecom network in the world.
- In India, the total telephone subscriber base stood at 1,190.33 million in December 2023.

## 3. SECOND-HIGHEST NUMBER OF INTERNET USERS

- India has the second-highest number of internet subscribers globally.
- The total number of internet subscribers reached 918.19 million at the end of September 2023.

## 4. HIGHER INVESTMENT FROM FOREIGN PLAYERS

- India plans to manufacture mobile phones worth US\$ 126 billion by 2025-26.
- In January 2022, Google made a US\$ 1 billion investment in Airtel through the India Digitization Fund.
- Similarly, global vendors such as Samsung, Cisco, Ciena, Jabil, Foxconn, Sanmina and Flex have shown interest in setting up manufacturing in India for telecom and networking products under the newly announced PLI scheme.
- FDI inflow in the telecom sector stood at US\$ 39.31 billion between April 2000-December 2023.



Source: Telecom Regulatory Authority of India (TRAI), News Articles

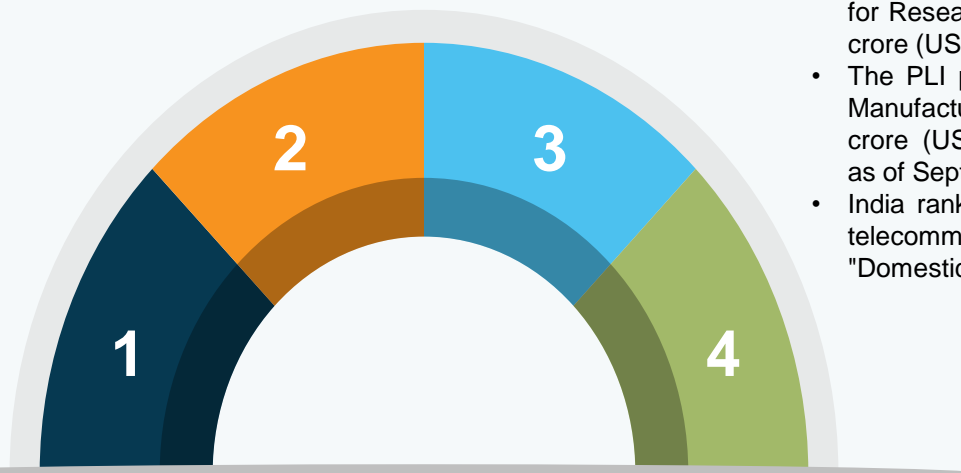


## 2. ATTRACTIVE OPPORTUNITIES

- India's 5G subscriptions to have 350 million by 2026, accounting for 27% of all mobile subscriptions.
- Prime Minister Mr. Narendra Modi launched 5G services on October 1, 2022.
- The Government of India has introduced Digital India programme where sectors such as healthcare, retail, etc. will be connected through Internet.
- The value of export of mobile phones in FY23 stood at Rs. 90,000 crore (US\$ 10.84 billion). Moreover, during April-June 2023, electronic goods exports were estimated at US\$ 6.89 billion.
- India ranks 2nd in "international mobile broadband internet traffic" and "international Internet bandwidth."
- By 2025, India will need ~22 million skilled workers in 5G-centric technologies such as Internet of Things (IoT), Artificial Intelligence (AI), robotics and cloud computing.

## 1. ROBUST DEMAND

- Tele-density of rural subscribers reached 58.56% in December 2023.
- Total volume of wireless data usage increased by more than 10 folds from 4,206 petabytes in Q1, FY18 to 47,629 petabytes in Q2, FY24.
- Also, India is one of the biggest consumers of data worldwide. As per TRAI, the average wireless data usage per wireless data subscriber was 19.08 GB per month in September 2023 from 61.66 MB in March 2014.



## 3. POLICY SUPPORT

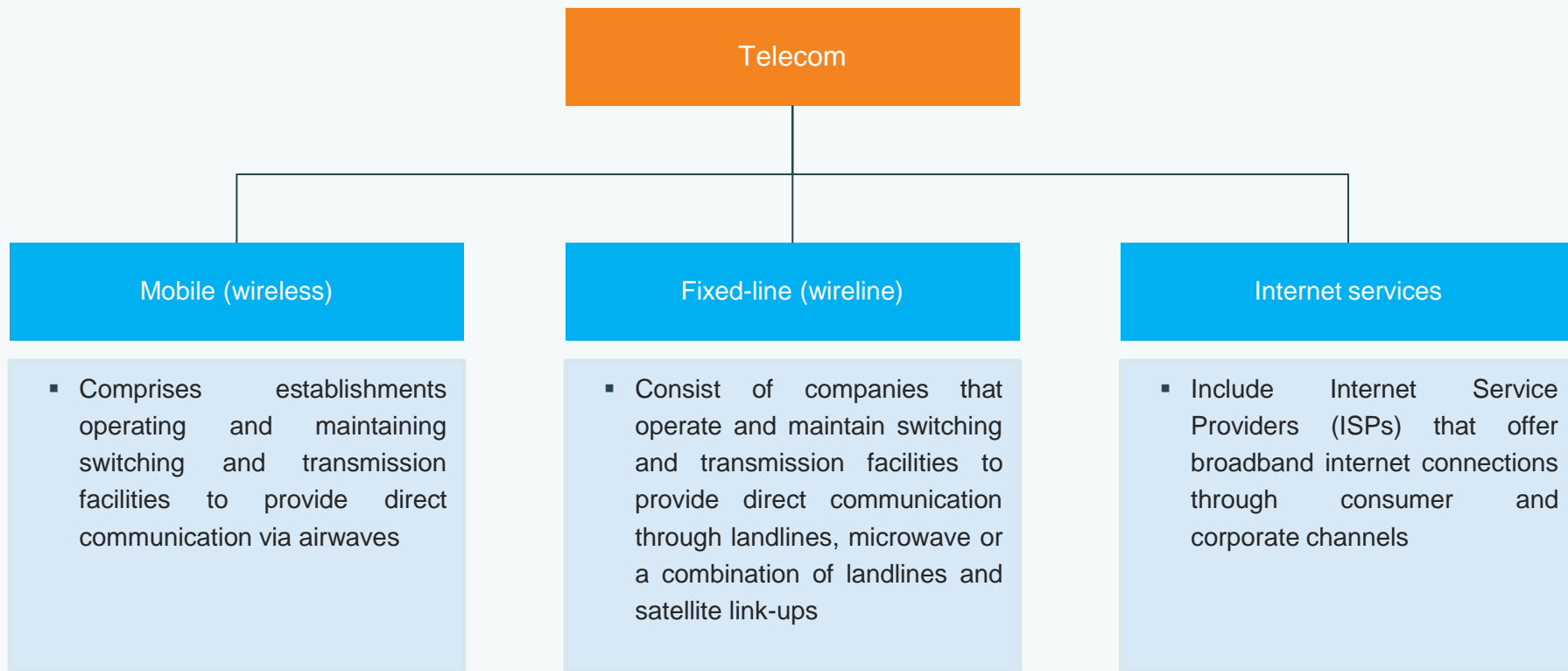
- The Union Cabinet approved Rs. 12,195 crore (US\$ 1.65 billion) production-linked incentive (PLI) scheme for telecom & networking products under the Department of Telecom. On December 2022, 42 companies have committed an investment Rs. 4,115 crore (US\$ 502.95 million) comprising 28 MSMEs and 14 Non-MSMEs (eight domestic and seven global companies) have been approved under the Production-linked Incentive (PLI) Scheme.
- In October 2021, the government notified 100% foreign direct investment (FDI) via the automatic route from previous 49% in the telecommunications sector.
- To drive the development of 6G technology, the Department of Telecommunications (DoT) developed a sixth generation (6G) innovation group.

## 4. INCREASING INVESTMENT

- In Union Budget 2023-24 the Department of Telecommunications was allocated Rs. 97,579.05 crore (US\$ 11.92 billion). Of this, Rs. 400 crore (US\$ 48.88 million) is for Research and Development, Rs. 5,000 crore (US\$ 611.1 million) is for BharatNet.
- The PLI plan for Large Scale Electronics Manufacturing received about Rs. 4,700 crore (US\$ 569.49 million) in investment as of September 2022.
- India ranks third in "Annual investment in telecommunication services" and "Domestic market size."



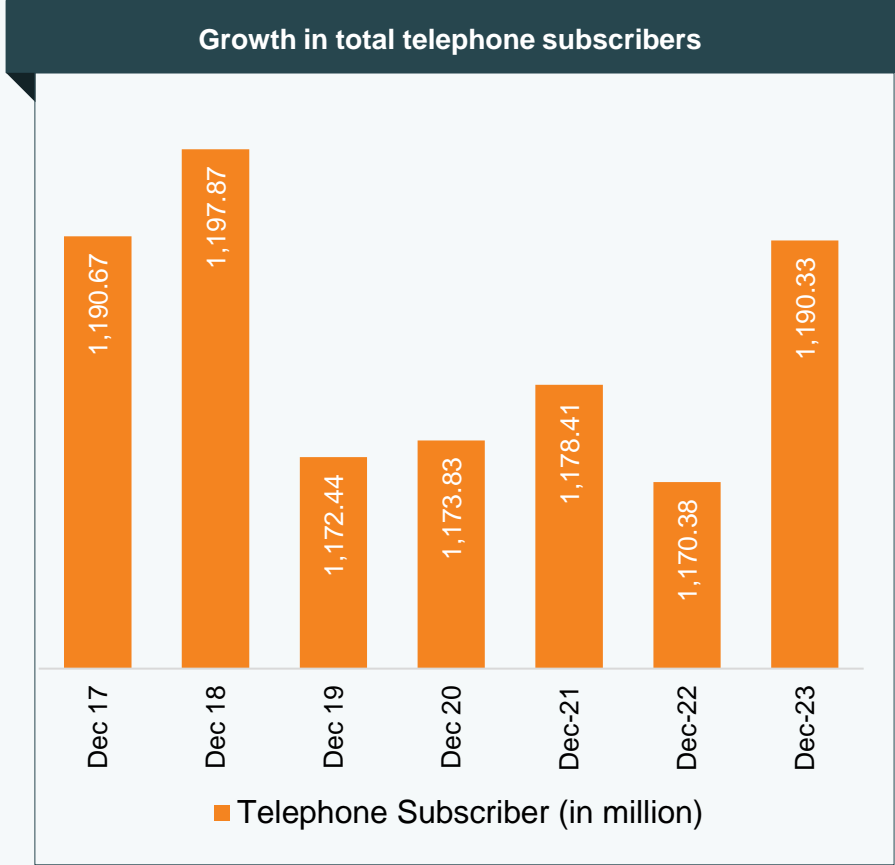
# The telecom market split into three segments



Source: Sutherland Research

# Expanding telecom subscriber base on the face of government initiatives

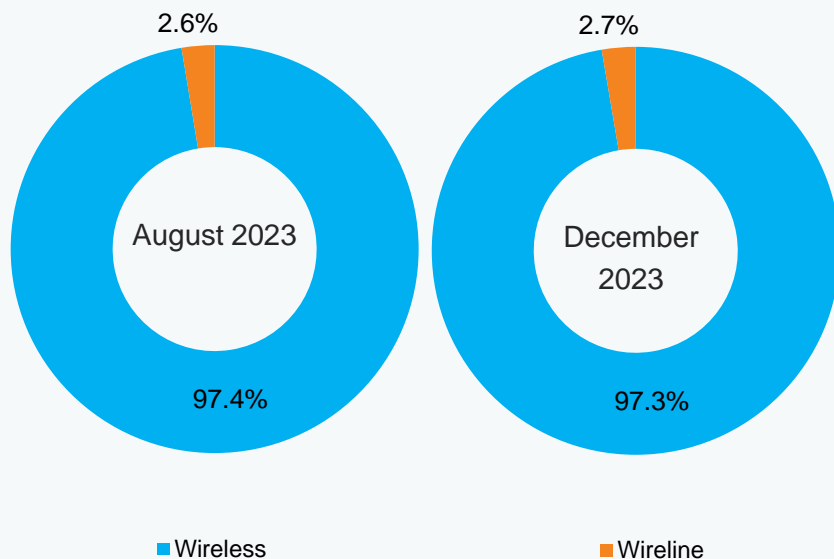
- India is currently the second-largest telecommunication market and has the second-highest number of internet users in the world.
- The PLI scheme in telecom and networking products aims to make India a global hub of manufacturing telecom equipment. It is estimated that full utilisation of the scheme funds is likely to lead to incremental production of about Rs. 2.4 lakh crore (US\$ 32.01 billion) with exports of ~Rs. 2 lakh crore (US\$ 26.67 billion) over five years.
- India's telephone subscriber base increased to 1,190.33 million in December 2023 from 1,170.38 billion in December 2022.
- In India, the total telephone subscriber base stood at 1,190.33 million in August 2023.
- In India, tele-density (defined as the number of telephone connections per 100 individuals) stood at 85.23%, as of December 2023.
- On November 15th, Prime Minister, Mr. Narendra Modi launched the Nyaya Maha Abhiyan, a three-year mission with a Rs. 24,000 crore (US\$ 2.9 billion) project outlay. Over the past three months, projects exceeding Rs. 7000 crore (US\$ 845.4 million) have been sanctioned, primarily focusing on housing, water, road, electricity, telecom, and Multipurpose Centres.



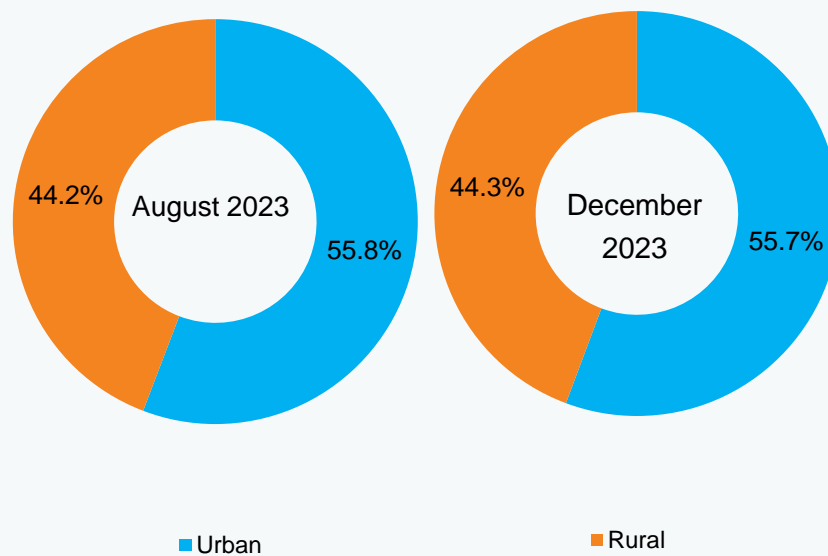
Source: Telecom Regulatory Authority of India, News articles

# Wireless segment and rural subscribers

Share of wireless and wireline segments in telephone subscriptions



Urban and rural subscribers

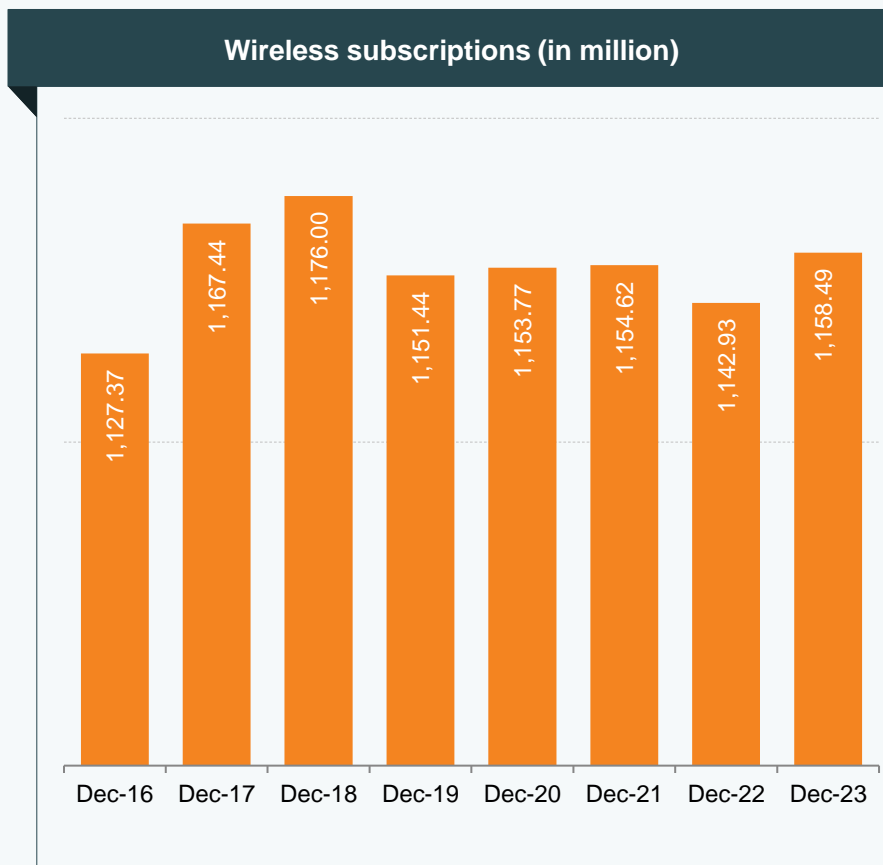


- The share of the rural segment in India's telecommunications market has increased steadily.
- The wireless segment accounted for 97.3% of the total telephone subscriptions in December 2023.

Source: Telecom Regulatory Authority of India

# Wireless subscriptions witness robust growth over the years

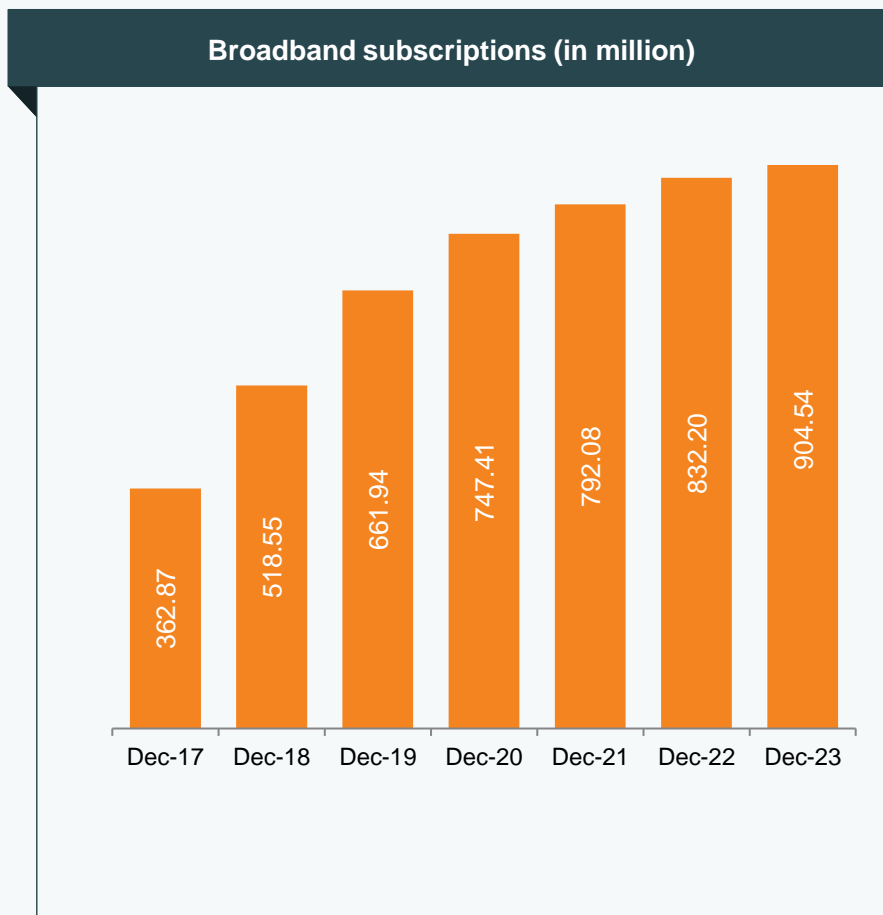
- Wireless subscription has grown robustly over the past few years.
- The growth in wireless subscriptions has led to a significant rise in wireless tele-density.
- As of December 2023, the wireless subscribers base stood at 1,158.49 million.
- As of December 2023, the wireless subscriber base of Jio stood at 470.19 million, followed by Bharti Airtel (264.76 million), Vodafone Idea 127.29 million, and BSNL (25.12 million).



Source: Telecom Regulatory Authority of India

# Strong growth in broadband drives internet access revenues

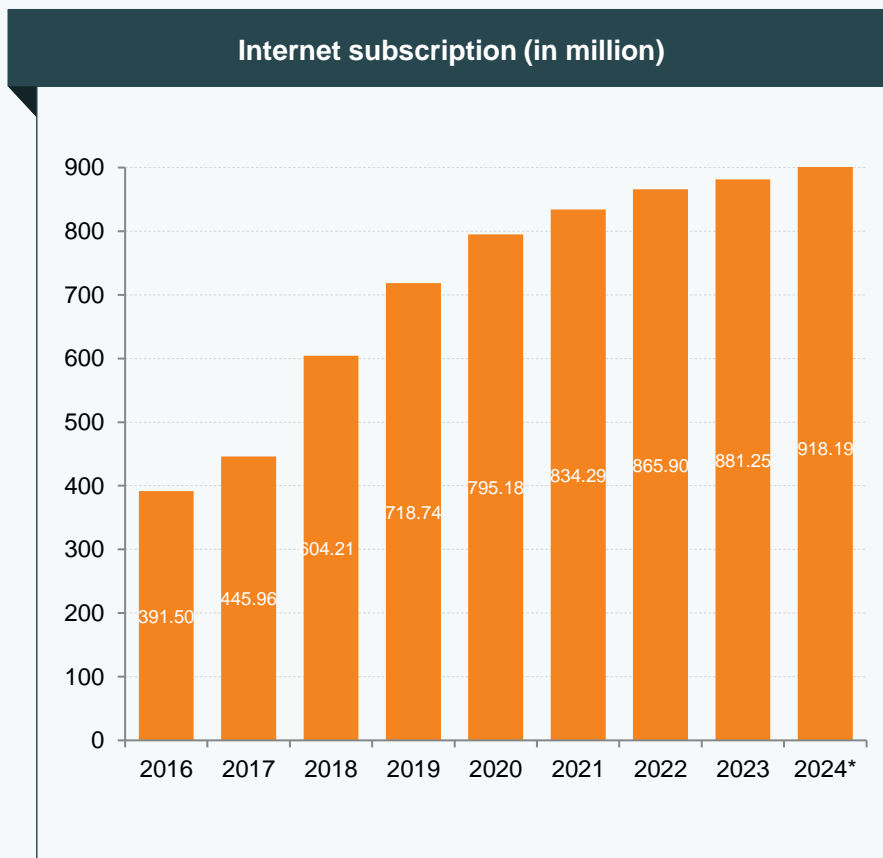
- Total broadband subscriptions in the country grew from 149.75 million in FY16 to 904.54 million in FY23 (April-December).
- The number of wired broadband subscriptions stood at 38.35 million in FY24 (April-December).
- Wireless broadband subscribers stood at 866.19 million in FY24 (April-December).
- As of December 2023, the top five service providers were as follows: Reliance Jio Infocom Ltd stood at 470.19 million, followed by Bharti Airtel (264.76 million), Vodafone Idea 127.29 million, and BSNL (25.12 million).



Source: Telecom Regulatory Authority of India;

# Number of internet subscribers increasing at a fast pace

- In April-September 2023 India's Internet subscribers reached 918.19 million of which 37.11 million were wired subscribers and 881.08 million were wireless internet subscribers.
- The number of internet subscribers in the country increased at a 12.04% CAGR from 391.5 million in 2016 to 918.19 million in 2023-24 (April-September).
- The number of internet subscribers during FY23 stood at 881.25 million.
- The number of internet subscribers in the country is expected to reach 900 million by 2025.
- India is likely to have 330 million 5G subscribers by 2026.
- India is home to more than 500 million smartphone users and over 100 million users with 5G-ready smartphones.
- Overall IP traffic expected to grow four-fold at a CAGR of 30% by 2021.
- Average wireless data usage per wireless data subscriber was 14.6 GB per month in FY21 and is expected to reach to 40 GB by 2026.



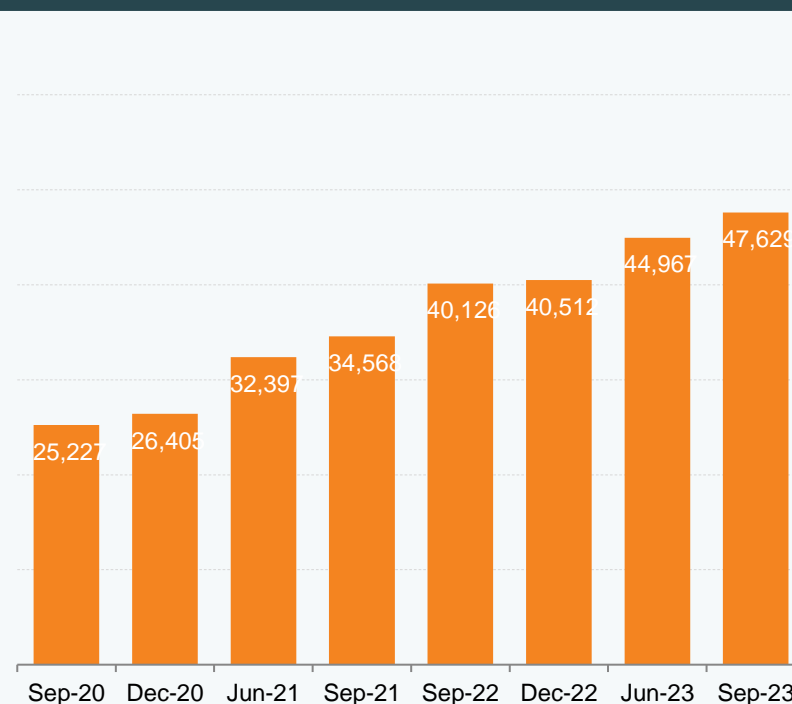
*Note: CAGR - Compound Annual Growth Rate; IP - Internet Protocol, 2021: \*until September 2023*

*Source: Telecom Regulatory Authority of India, Business Monitor International*

# Exponential growth in data consumption

- India holds the distinction of being the largest consumer of mobile data globally.
- Data consumption in the country has witnessed exponential growth over the course of the past few years.
- The aggregated data consumed as of September 2023, was 73,23,038 GB.
- The total wireless data usage in India grew at a rate of 5.9% from 44,967 PB in June 2023 to 47,629 PB in September 2023.
- Out of total data wireless usage, 2G data usage was 46 PB, 3G data usage was 353 PB, 4G data usage was 42,505 and 5G data usage was 2,063 PB during the (April 2023- June 2023) quarter.
- The contribution of 2G, 3G, 4G and 5G data usage to the total volume of wireless data usage was at 0.10%, 0.78%, 94.53% and 4.59% for quarter ended June 2023.

**Total Wireless Data Usage (in Petabytes)**



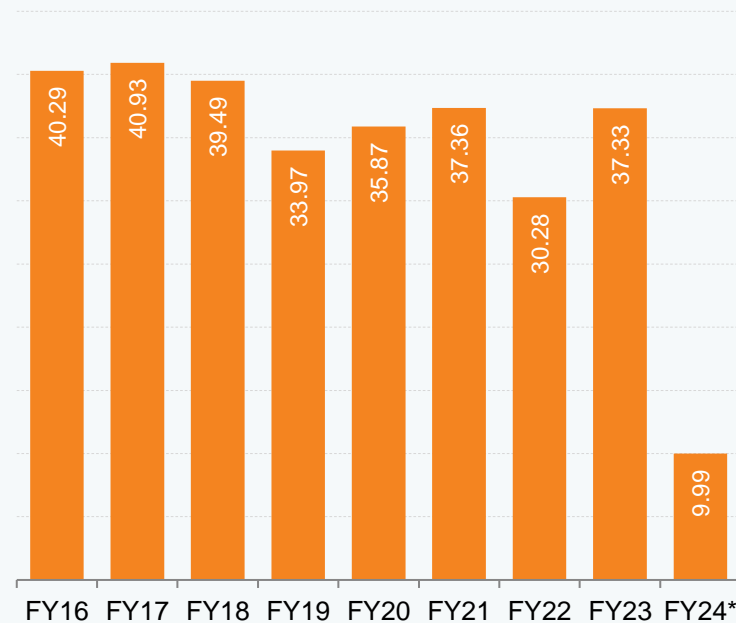
*Note: CAGR - Compound Annual Growth Rate, PB- Petabytes*

*Source: Telecom Regulatory Authority of India*

# Telecom revenues

- During FY23, the gross revenue from the telecom sector stood at Rs. 3.1 lakh crore (US\$ 37.33 billion).
- Gross revenue of the telecom sector stood at Rs. 82,741 crore (US\$ 9.9 billion) in the second quarter of FY24.
- The Indian telecom sector's revenue grew at 4.16% in FY21 from FY20 on the back of stabilising tariff wars and increased spending by subscribers due to minimum recharge plans.
- In August 2021, the Department of Telecommunications (DoT) officials stated that it is working on a package, which includes reducing the revenue share licence fee to 6% of adjusted gross revenue (AGR) of the operators from the current 8%. This would be done by reducing the 5% universal service obligation levy by two percentage points and providing relief of about Rs. 3,000 crore (US\$ 403.63 million) annually to the operators.

Telecom Sector Gross Revenue (US\$ billion)



**Note:** \*- April – September ; CAGR - Compound Annual Growth Rate, FY - Indian Financial Year (April - March),

**Source:** Telecom Regulatory Authority of India's Performance Indicator Report

# Emergence of tower industry

- The four operators running the telecom network utilized 7,50,718 towers as of February 2023. Therefore, there had been a nearly 60% increase and a 40% increase in towers and Base Transceiver Stations (BTS), respectively, since December 2017. The number of Mobile BTS are 23.98 lakh in December 2022.
- To make India 5G-ready, there's a push for fiberisation of telecom towers. Currently, 36% of towers are fiberized, and plans involve deploying 12 lakh towers.
- A surge in the subscriber base has necessitated network expansion covering a wider area, thereby creating a need for significant investment in telecom infrastructure.
- To curb cost and focus on core operations, telecom companies have been segregating their tower assets into separate companies. For example: Reliance Communications has decided to finalise a deal to sell its stake in Reliance Infratel. The value of the deal is around US\$ 3.68 billion.
- Creating separate tower companies has helped telecom companies lower operating cost and improve capital structure. This has also provided an additional revenue stream.
- Inspired by the success seen by Indian players in towers business, most of the operators around the world are replicating the model.
- In April 2021, Bharti Airtel Ltd. announced a new corporate structure by forming a new telecom entity to sharpen its focus on digital assets. The telco has formed a new subsidiary, Airtel Ltd., which will house its telecom business.
  - In the same month, Dixon Technologies (India) Ltd. partnered with Bharti Enterprises Ltd. to make telecom and networking equipment. Under the deal, Dixon will make modems, routers, set-top boxes and IoT devices for telcos including Bharti Airtel Ltd.

*Source: News Research*

# Key players in the telecom sector



## RELIANCE JIO INFOCOMM LIMITED

Total Broadband Subscribers: **470.19 million**

Wireline Subscriber Base: **10.38 million**

Market Share of Broadband Services: **51.98%**



## BHARTI AIRTEL LIMITED

Total Broadband Subscribers: **264.76 million**

Wireline Subscriber Base: **7.39 million**

Market Share of Broadband Services: **29.27%**



## VODAFONE IDEA LIMITED

Total Broadband Subscribers: **127.29 million**

Wireline Subscriber Base: **0.01 million**

Market Share of Broadband Services: **14.07%**



## BHARAT SANCHAR NIGAM LIMITED

Total Broadband Subscribers: **25.12 million**

Wireline Subscriber Base: **3.83 million**

Market Share of Broadband Services: **2.78%**

*Note: Data as of December 2023*

# Recent Trends and Strategies



# Notable trends in the Indian telecom sector... (1/4)

1

## Green telecom

- The green telecom concept is aimed at reducing carbon footprint of the telecom industry through lower energy consumption.
- The Government proposed a joint task force between Ministry of New and Renewable Energy (MNRE) and Department of Telecommunication to promote green technology in the sector.

2

## Expansion to rural market

- Dedicated government schemes BharatNet Project Scheme, Telecom Development Plan, Aspirational District Scheme, initiatives in North-Eastern Region through Comprehensive Telecom Development Plan (CTDP), etc resulted in a 200% increase in rural internet subscriptions between 2015 to 2021.
- Over 62,443 uncovered villages in India will be provided with village telephone facility with subsidy support from the government's Universal Service Obligation Fund (thereby increasing rural tele-density).
- Broadband service provider, Excitel, plans to raise Rs. 200 crore (US\$ 28.37 million) in funding as it plans to expand FTTH (fibre to the home) deployment on its network and establish presence in 50 cities by December 2021.

3

## Emergence of BWA technologies

- Prime Minister Mr. Narendra Modi launched 5G services on October 1, 2022. As of January 31, 2023, 5G services were launched in 238 cities in all license service areas.
- BWA technologies, such as WiMAX and LTE, is among the most recent and significant developments in wireless communication.
- India is expected to be the second-largest market in 5G services followed by China in the next 10 years.

4

## Commercial SMS traffic

- Due to higher post-pandemic digital adoption, daily commercial SMS traffic in India, currently, has increased by ~20%, even as overall text messaging continues to shrink. At present, ~1.3 billion commercial SMSs are sent every day.

Notes: BWA - Broadband Wireless Access, TRAI - Telecom Regulatory Authority of India  
Source: News Articles

# Notable trends in the Indian telecom sector... (2/4)

5

## Internet of Things (IoT)

- IoT is the concept of electronically interconnected and integrated machines, which can help in gathering and sharing data. The Indian Government is planning to develop 100 smart city projects where IoT will play a vital role in development of those cities.
- Reliance Jio has partnered with Samsung Electronics to set up a nationwide IoT network.

6

## Public Wi-Fi Networks

- RailTel, a mini Ratna PSU launched Prime Minister Wi-Fi Access Network Interface (PM-WANI) to access its Public WiFi services across 100 railway stations having 2,384 WiFi hotspots in 22 states.
- In December 2020, the Union Cabinet, chaired by the Prime Minister, Mr. Narendra Modi, approved a proposal by Department of Telecommunications for setting up of Public Wi-Fi Networks by Public Data Office Aggregators (PDOAs) to provide public Wi-Fi services through Public Data Offices (PDOs).

7

## Universal Service Obligation Fund

- USOF officially launched Telecom Technology Development Fund (TTDF) Scheme on October 1, 2022
- In December 2020, the Union Cabinet, chaired by the Prime Minister, Mr. Narendra Modi, approved the provision for a 'Universal Service Obligation Fund (USOF)' scheme to provide mobile coverage in Arunachal Pradesh and two districts of Assam, namely KarbiAnglong and Dima Hasao, under the Comprehensive Telecom Development Plan (CTDP) for the North Eastern Region (NER).

8

## Satellite-based Narrowband-IoT Network

- In December 2020, BSNL, in partnership with Skylotech India, announced a breakthrough in satellite-based NB-IoT (Narrowband-Internet of Things) for fishermen, farmers, construction, mining and logistics enterprises.

Source: Press Information Bureau

# Notable trends in the Indian telecom sector... (3/4)

9

## Investment in optical fibre network

- With the launch of 5G, telecommunication companies are expected to invest US\$ 2.5 billion on optical fibers.
- In January 2020, HFCL Limited, formerly known as Himachal Futuristic Communications, supplied indigenously designed, developed and manufactured 100,000 Wi-Fi systems in a record time, and stated that Wi-Fi Access Network Interface (WANI) with the government's ambitious BharatNet initiative would augment broadband uptake in rural India. Reliance Jio Infocomm is going to expand its optical fibre network to over 1,100 cities under its Jio GigaFiber brand
- On September 21, 2020, Prime Minister, Mr. Narendra Modi launched a project to connect all 45,945 villages in Bihar with optical fibre internet service

10

## Consumer spending

- In the first quarter of FY21, customer spending on telecom services increased 16.6% y-o-y, with over three-fourths spent on data services. This spike in consumer spending came despite of the COVID-19 disruption and lack of access of offline recharges for a few weeks

11

## Rising investment

- As of March 2023, Jio partnered with EESL to provide 1 million smart prepaid meters in Bihar.
- As of March 2023, the PLI scheme for Large-Scale Electronics Manufacturing (LSEM) attracted investment of Rs. 5,998 crore (US\$ 726.77 million) and led to a total production of Rs. 2,76,903 crore (US\$ 33.55 billion), including exports of Rs. 1,28,886 crore (US\$ 15.61 billion).
- In May 2023, STT GDC invested Rs. 2,000 crore (US\$ 242.33 million) in two more data centres in Pune.
- In Q1 of FY22, the Indian technology, media and telecom (TMT) sector leads the M&A market in India bagging deals worth US\$ 11.5 billion.
- In August 2022, the Government of India received investments worth Rs. 1,50,173 crore (US\$ 18.83 billion) for its 5G spectrum.

Source: 'Searching for New Frontiers of growth: Indian Banks'- PwC, Reserve Bank of India, Press Information Bureau, News Articles

# Notable trends in the Indian telecom sector... (4/4)

12

## Consolidation

- Vodafone India and Idea have merged into Vodafone idea. Vodafone Idea unified assets and completed network integration in June 2020.

13

## Mobile banking

- Department of Posts launched mobile banking for its saving account customers.
- As of July 2023, 473 banks were live on unified payment interface (UPI).

14

## Digital experience

- In March 2021, Vodafone Idea Ltd. (VIL) announced that the acquired spectrum in five circles would help improve 4G coverage and bandwidth, allowing it to offer 'superior digital experience' to customers.

15

## Partnership

- Vodafone Idea has partnered with Indian Council for Research on International Economic Relations (ICRIER) called InViCT to set up a telecom Centre of Excellence.
- In August 2021, Tata Group company Nelco announced that the company talked with Canadian firm Telesat to sign a commercial pact for launching fast satellite broadband services in India under the latter's Lightspeed brand, a move which would pit the combined entity against Bharti Enterprises-backed OneWeb, Elon Musk's SpaceX and Amazon.
- In March 2021, Advanced Television Systems Committee (ATSC) and Telecommunications Standards Development Society, India (TSDSI) signed a deal to boost adoption of ATSC standards in India in order to make broadcast services available on mobile devices. This allows the TSDSI to follow ATSC standards, fostering global digital broadcasting standard harmonisation.

Source: News Articles

# Strategies adopted



## MARKETING STRATEGY

- Players are using innovative marketing strategies to succeed in this sector.
- Vodafone Idea launched #StrongerEveryHour with an aim to highlight the improved network of Vodafone SuperNet 4G - India's Data Strong Network.
- Airtel launched a new ad campaign 'Sab Kuch Try Karo, Fir Sahi Chuno' and rolled out a new campaign 'Open to Questions', highlighting its aim to resolve every single customer query, learn quickly from failures and ensure these are not repeated.



## DIFFERENTIATION

- Players differentiate themselves by providing different services to customers.
- Bharti Airtel has already partnered with Amazon Prime and Hotstar and is expected to tie up with Netflix to offer free subscription to Netflix's content for its mobile customers.
- In September 2020, Reliance Jio partnered with 22 foreign airlines for inflight internet connectivity with plans starting at Rs. 499 (US\$ 6.76) per day.
- In September 2020, Airtel and Radware partnered to offer cloud security services to businesses in India.



## REDUCED NUMBER OF PLANS

- Players have reduced the number of plans on offer and now offer a limited number of simple tariff plans along with marquee plans.
- This has simplified choosing plans for customers as they can choose the best deals for themselves.






## PRICING STRATEGY

- Player's price their products very carefully due to the price sensitive nature of customers and high competition in the sector.

*Notes: CDMA - Code Division Multiple Access, GSM - Global System for Mobile Communication*

*Source: Company website and News Articles*

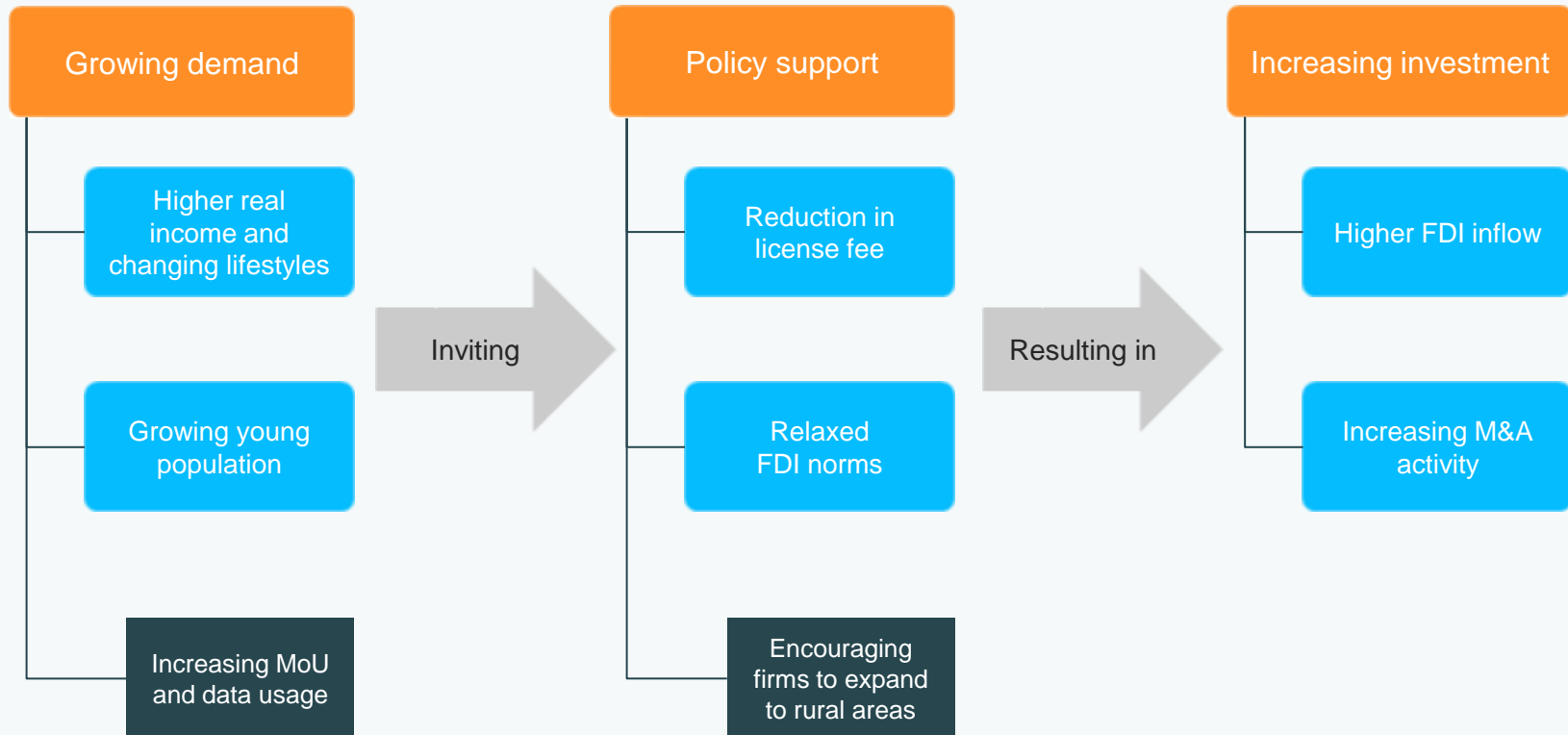
# Key companies in the market

	Company	Ownership	Presence
	Mahanagar Telephone Nigam Ltd (MTNL)	Government (56.25%), Life Insurance Corporation (18.8%)	Fixed-line and mobile telephony (in Delhi and Mumbai), data and Internet
	Bharat Sanchar Nigam Ltd (BSNL)	Government (100%)	Fixed-line and mobile telephony (GSM - outside Delhi and Mumbai), data and Internet in 22 circles
	Bharti Airtel	Bharti Group (43.93%), Pastel Ltd (10.39%), Indian Continent Investment (4.56%),	Broadband and mobile (GSM) in 22 circles
	Vodafone Idea Limited	Aditya Birla Group and Vodafone Group partnership	Broadband and mobile (GSM) in 22 circles
	Reliance Jio Infocomm	Reliance Industries Limited.	Broadband and mobile in 22 circles

Source: Companies' website, Moneycontrol

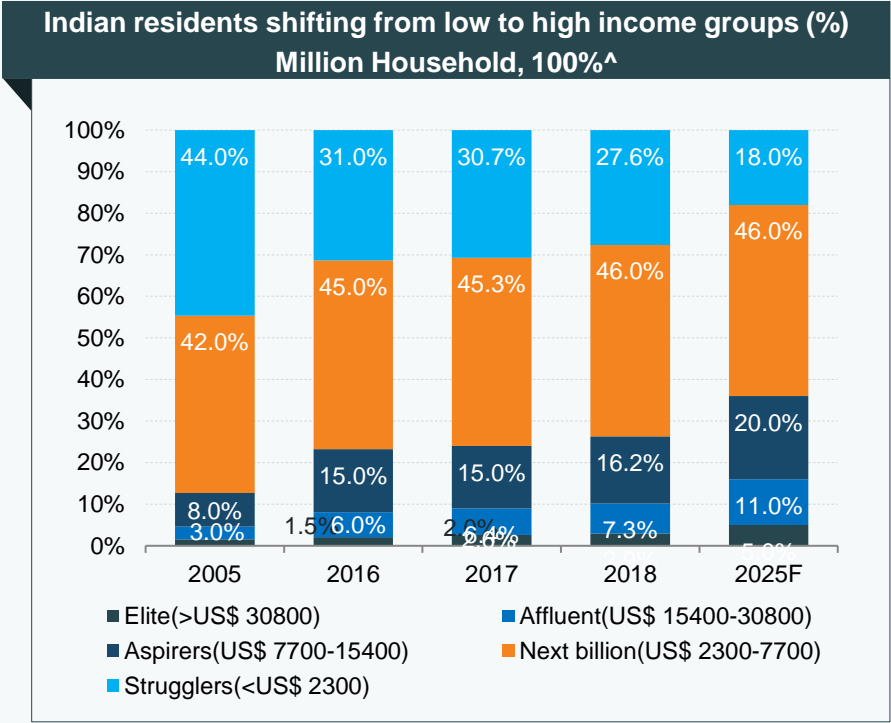
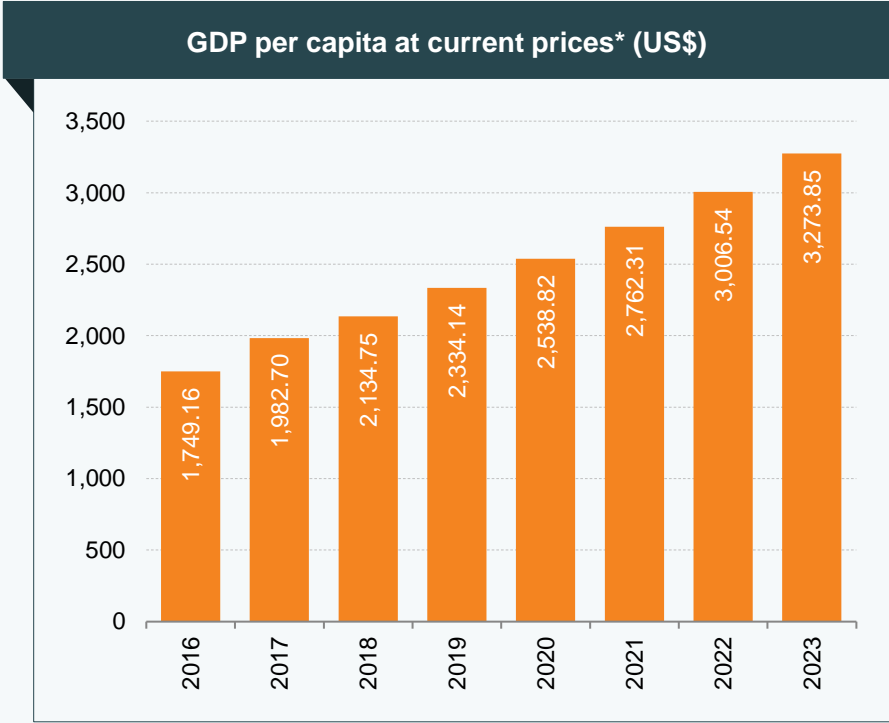


# Sector benefits from rising income, growing young population



**Note:** FDI - Foreign Direct Investment, MOU - Minutes of Use per month and per subscriber, M&A - Mergers and Acquisitions

# Rising income and growing rural market fuels demand for telecom services



- Incomes have risen at a brisk pace in India and will continue rising given the country's strong economic growth prospects.
- GDP per capita of India grew at a CAGR of 7.47% from US\$ 1,481.56 in 2012 to US\$ 3,273.85 in 2023.
- Increasing income has been a key determinant of demand growth in the telecommunication sector in India.
- The emergence of an affluent middle class is triggering demand for the mobile and internet segments.
- A young growing population is aiding this trend (especially the demand for smart phones).

**Notes:** CAGR - Compound Annual Growth Rate, \*Estimates after 2013, ^Data for 2005, 2006 and 2025 is from BCG's *The New Indian: The Many Facets of a Changing Consumer*, for 2017 from IBM-Kalaari Capital's *Imagining a Trillion Dollar Digital India* and for 2018 from Redseer Consulting's *Indian Habit of Being Healthy*  
**Source:** IMF World Economic Outlook Database April 2018

## 1

### To compensate the consumers in case of call drop

- In August 2017, TRAI directed operators to have a call-drop rate of not greater than 2%.
- The policy measures of TRAI have had a positive impact. Call-drops in the country decreased from 0.94% in 2016 to 0.52% in March 2018.

## 2

### Standards of quality wireline and wireless services

- The government plans to update extant regulatory framework with the Indian Telecommunication Bill, 2022.
- In 2015, TRAI made regulations to amend the standards of quality of wireline (telephone service) and cellular mobile telephone services. These regulations has been laid down to ensure effective compliance with the quality-of-service regulations and to protect the interest of the customers.

## 3

### Relaxed FDI norms

- FDI in telecom sector has been increased to 100% from 74%.
- In October 2021, the government notified 100% foreign direct investment (FDI) via the automatic route from previous 49% in the telecommunications sector.
- FDI of up to 100% is permitted for infrastructure providers offering dark fibre, electronic mail and voice mail.

## 4

### Telecommunication tariff order

- In February 2018, TRAI passed the Telecommunication Tariff (63rd amendment) order, according to which, telecom firms are free to give promotional offers to customers if the offers are transparent, non-predatory and non-discriminatory.
- The Telecom Regulatory Authority of India (TRAI) has issued a Telecom Tariff (69th amendment) Order 2022 on "Tariff for SMS and Cell Broadcast alerts disseminated through Common Alerting Protocol (CAP) platform during disasters/non-disasters". Department of Telecom (DoT) has requested TRAI to provide tariff for SMS and Cell Broadcast alerts/messages to be disseminated by TSPs through the CAP platform during disasters/non-disasters.

*Notes: FDI - Foreign Direct Investment, FIPB - Foreign Investment Promotion Board*

*Source: TRAI, News Articles*

## 5

### International Tie-ups

- On January 15, 2021, India and Japan signed an MoU to enhance cooperation in the field of Information and Communications Technologies. The MoU was signed between the Union Minister for Communications, Electronics and IT, Ravi Shankar Prasad, and the Japanese Minister for Internal Affairs and Communications, Takeda Ryota.
- In October 2021, British satellite operator Inmarsat Holdings Ltd. announced that it is the first foreign operator to get India's approval to sell high-speed broadband to planes and shipping vessels. Inmarsat will access the market via Bharat Sanchar Nigam Ltd. (BSNL) after BSNL received a license from the Department of Telecommunications.

## 6

### Financial support

- In August 2021, the Department of Telecommunications (DoT) initiated discussions with banks to address financial stress in the telecom sector, particularly Vodafone Idea Ltd. (VIL) that urgently requires fund infusion to stay afloat.
- The USOF (Universal Service Obligation Fund) is expected to extend financial support to operators providing services in rural areas and encourage active infrastructure sharing among operators.

## 7

### Set up internet connections

- The Department of Information Technology intends to set up over 1 million internet-enabled common service centres across India as per the National e-Governance Plan.
- On August 8, 2016, TRAI made the 10th amendment to the TCPR (Telecom Consumers Protection Regulations) permitting telecom companies to offer data packs having maximum validity of 365 days.

Source: TRAI, News Articles

## 8

### Indian Mobile Congress

- On December 8, 2020, Prime Minister Mr. Narendra Modi inaugurated and addressed the virtual edition of the India Mobile Congress (IMC) 2020.
- The objective of IMC 2020 was to align with the Prime Minister's vision to promote 'Aatmanirbhar Bharat', 'Digital Inclusivity' and 'Sustainable development, entrepreneurship & innovation' and drive foreign and local investments, encourage R&D in the telecom and emerging technology sectors.

## 9

### Enhanced spectrum limit

- The prescribed limit on spectrum will be increased from 6.2 MHz to 2x8 MHz (paired spectrum) for GSM technology in all areas other than Delhi and Mumbai, where it will be 2x10 MHz (paired spectrum).
- Telecom players can, however, obtain additional frequency. there will be an auction of spectrum subject to the limits prescribed for the merger of licenses.
- On January 6, 2021, the Department of Telecommunications (DoT) issued Notice Inviting Applications (NIA) for auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1,800 MHz, 2,100 MHz, 2,300 MHz and 2,500 MHz bands. Last date for submission of applications for participation in the auction marked at February 5, 2021, and auction to commence online from March 1, 2021.

## 10

### Quantum Communication Lab

- In October 2021, Telecom Secretary Mr. K. Rajaraman inaugurated the Quantum Communication Lab at the Centre for Development of Telematics (C-DOT), Delhi, and unveiled the indigenously developed Quantum Key Distribution (QKD) solution by C-DOT. QKD can support a distance of >100 kms on standard optical fibre.
- Development of the QKD solution is likely to address the threat posed by rapid advancement in quantum computing to the security of data being transported by the current communication infrastructure.

Source: TRAI, News Articles

## 11

### Make in India

- Government of India announced the Phased Manufacturing Programme (PMP) to promote domestic production of mobile handsets. This initiative will help in building a robust indigenous mobile manufacturing ecosystem in India and incentivise large scale manufacturing.
- In January 2020, HFCL Limited, formerly known as Himachal Futuristic Communications, supplied indigenously designed, developed and manufactured 100,000 Wi-Fi systems in a record time, and stated that Wi-Fi Access Network Interface (WANI) with the government's ambitious BharatNet initiative would augment broadband uptake in rural India.
- In March 2020, the Government approved the production-linked incentive (PLI) scheme for Large Scale Electronics Manufacturing. The scheme proposes production linked incentive to boost domestic manufacturing and attract large investments in mobile phone manufacturing and specified electronic components including Assembly, Testing, Marking and Packaging (ATMP) units.

## 12

### BharatNet Project: Tender Invited for Public Private Partnership

- Up to July 2022, 584,747 km length of Open Fiber Control (OFC) was laid connecting 187,245 Gram Panchayats. In 181,888 Gram Panchayats the service is ready on fiber and satellite.
- In July 2021, Bharat Broadband Network Limited (BBNL), on behalf of the Department of Telecommunications, invited global tender for the development of the Public Private Partnership model in 9 separate packages across 16 states for a concession period of 30 years. Under this project, the government through BharatNet provided a maximum grant of Rs. 19,041 crore (US\$ 2.56 billion) as viability gap funding.
- The project will cover ~3.61 lakh villages (including gram panchayats) across Kerala, Karnataka, Rajasthan, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, West Bengal, Assam, Meghalaya, Manipur, Mizoram, Tripura, Nagaland and Arunachal Pradesh.
- As of February 2022, BharatNet connected 171, 000 blocks and a total of 5,000 terabytes of data was consumed every month.

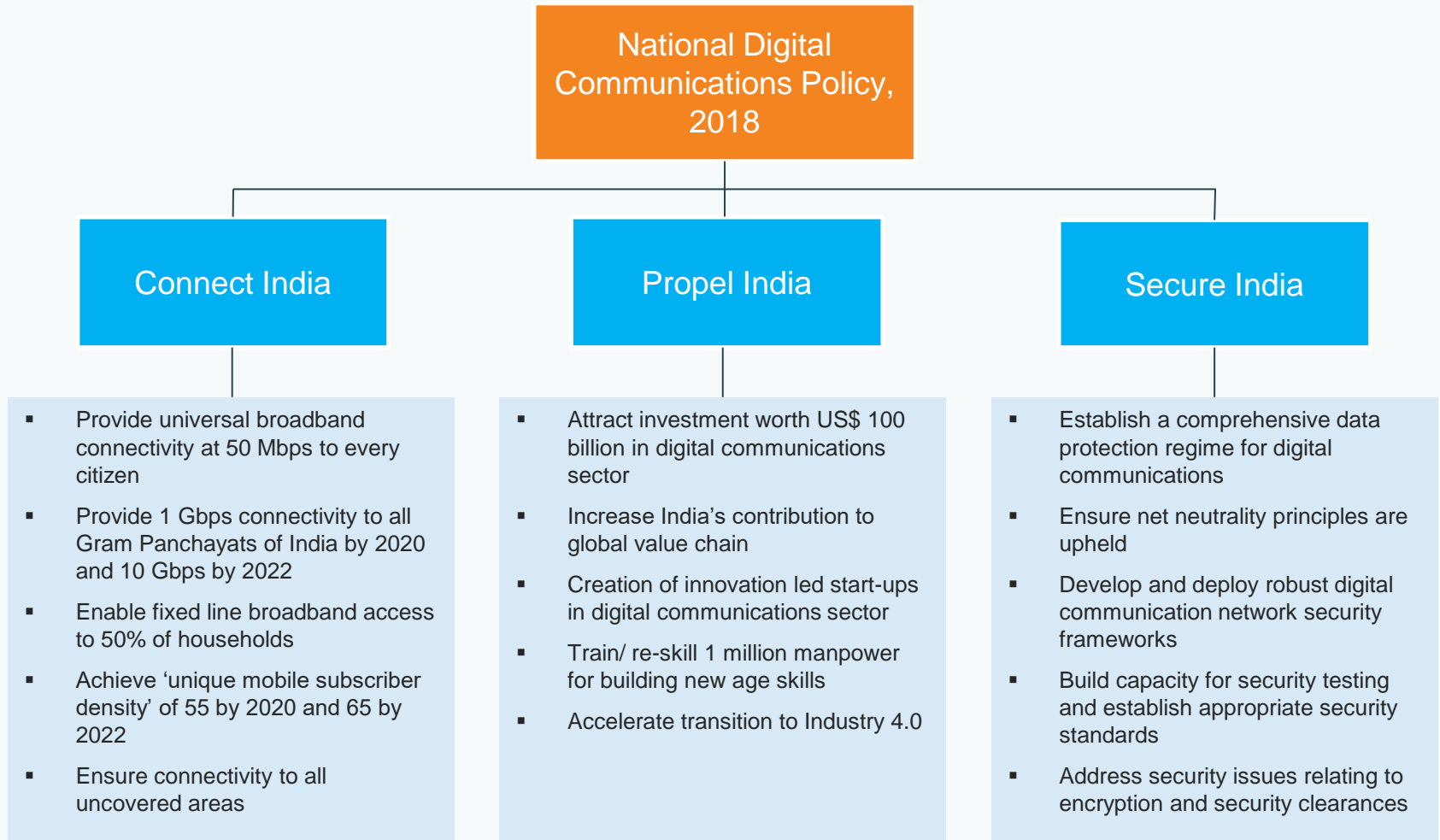
## 13

### Other Reforms

- In September 2021, the Indian government approved structural and process reforms in the telecom sector to protect and generate employment opportunities, promote healthy competition, protect interests of consumers, encourage investments and reduce regulatory burden on telecom service providers.

Source: TRAI, News Articles

# National digital communications policy - 2018



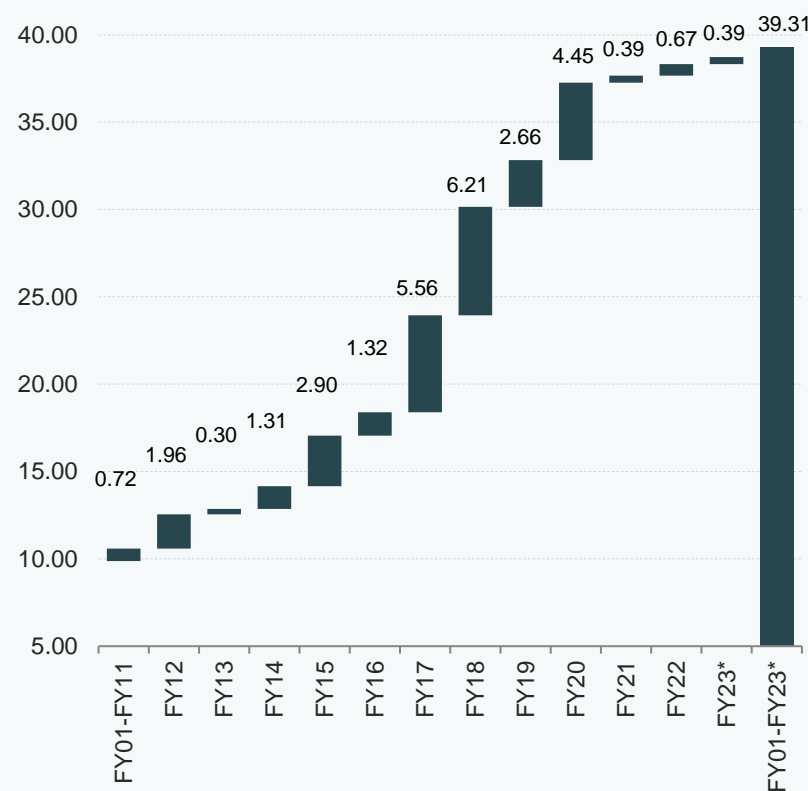
*Note: Mbps - Mega bits per second, Gbps - Giga bits per second*

*Source: National Digital Communications Policy, 2018*

# Foreign investment flowing in... (1/2)

- FDI inflow in the telecom sector stood at US\$ 39.31 billion between April 2000-December 2023.
- In the same period, FDI inflow in the sector accounted for ~5.9% share of the total FDI inflows in the country.
- Most large players see the PLI scheme in telecom and networking products as a growth opportunity. In April 2021, the government pointed out that firms such as Ericsson and Nokia are eager to expand their operations in India and global companies such as Samsung, Cisco, Ciena and Foxconn have expressed interest to set up their manufacturing base in the country for telecom and networking products.
  - The PLI scheme expected to bring in investments of about Rs. 3,000 crore (US\$ 400.08 million) and generate huge direct and indirect employment.
  - On October 14, 2021, 31 companies comprising 16 MSMEs and 15 Non-MSMEs (eight domestic and seven global companies) have been approved under the Production-linked Incentive (PLI) Scheme.
- In October 2021, Dixon Technologies announced plans to invest Rs. 200 crore (US\$ 26.69 million) under the telecom PLI scheme; this investment included the acquisition cost of Bharti Group's manufacturing unit.
- In January 2022, Google made a US\$ 1 billion investment in Airtel through the India Digitization Fund.

**FDI inflows in telecommunication from April 2000-December 2023 (US\$ billion)**



\*April to December 2023

Source: Department for Promotion of Industry and Internal Trade (DPIIT)

## Foreign investment flowing in ... (2/2)

- Vodafone India and Idea Cellular merged into 'Vodafone Idea'.

### Foreign investment in India

Target	Acquirer	Acquisition price (US\$ million)	Division acquired
Aqilliz	Bharti Airtel	NA	10%
Bharti Airtel	Google International	700	1.28%
ValueFirst	Twilio	NA	100% stake
Bharti Airtel	Singtel (as of February 2019)	367.15	Increase in stake to 48.90%
Bharti Airtel	Singtel (2018)	411.02	Increase in stake to 27.08%
Ascend Telecom Infrastructure Pvt. Ltd.	IDFC Alternatives (2017)	54.29	33% stake
Telenor	Bharti Airtel (2017)	N/A	Infrastructure and Contracts
Bharti Airtel's operations in Burkina Faso and Sierra Leone	Orange SA (2016)	900	100% stake
MTS	Reliance Communication (2015)	736.98	8 - 10% stake
Augere Wireless	Bharti Airtel (2015)	21.3	100% stake
Bharti Airtel	Singtel (2013)	302	Increases stake to 32.34%
Bharti Airtel	Qatar Foundation Endowment(2014)	1,260	PE deal - 5% stake
Vodafone India Ltd	Vodafone International Holdings (2014)	1,641	Increases stake to 100%
Ascend Telecom	Ascend Telecom Infrastructure Pvt Ltd	54.29	33% stake

*Notes: M&A - Merger and Acquisition, PE - Private Equity*

*Source: Thomson Banker, Deal Tracker, Grant Thornton*

# Opportunities



# Opportunities across segments in the industry

## 1. Increasing mobile subscribers

- India is the second-largest smartphone market in the world. India's mobile subscriber base is expected to reach 1,420 million by 2024 from 1,200 million in 2018.
- By 2022, the 4G user base was expected to reach 820 million.

## 2. Untapped rural markets

- Tele-density of rural subscribers reached 58.56% in December 2023.

## 3. Rising internet penetration

- Internet penetration is expected to grow steadily and is likely to be bolstered by Government policy.
- Number of broadband subscribers reached 904.54 million in December 2023.
- To encourage cash economy, Indian Government announced to provide free Wi-Fi to more than 1,000 gram panchayats.

## 4. Development of telecom infrastructure

- TRAI has made several recommendations for the development of telecom infrastructure, including tax benefits and recognising telecom infrastructure as essential infrastructure.

## 5. Growth in MVAS

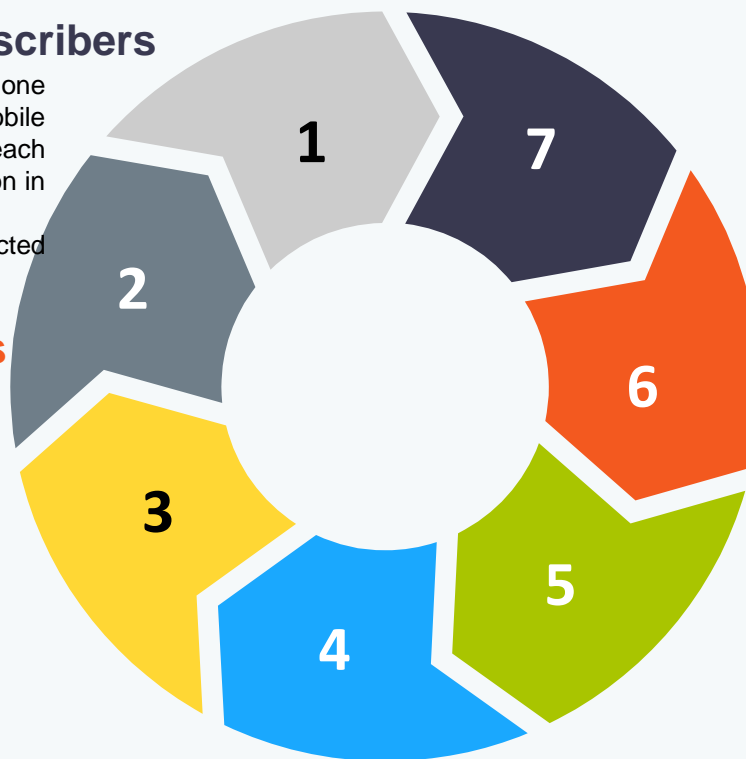
- Indian Mobile Value-Added Services (MVAS) industry was expected to grow at a CAGR of 18.3% during the forecast period of 2015-2020 and reach US\$ 23.8 billion by the end of 2020.

## 7. Growing Cashless Transactions

- In order to overcome the cash related problems being faced by people, due to demonetisation, Paytm launched a service through which consumers and merchants can pay and receive money instantly, without an internet connection.
- Payments on unified payments interface (UPI) hit an all-time high of 97.88 million (by volume), with transactions worth ~Rs. 12.98 trillion (US\$ 157.85 billion) in January 2023.

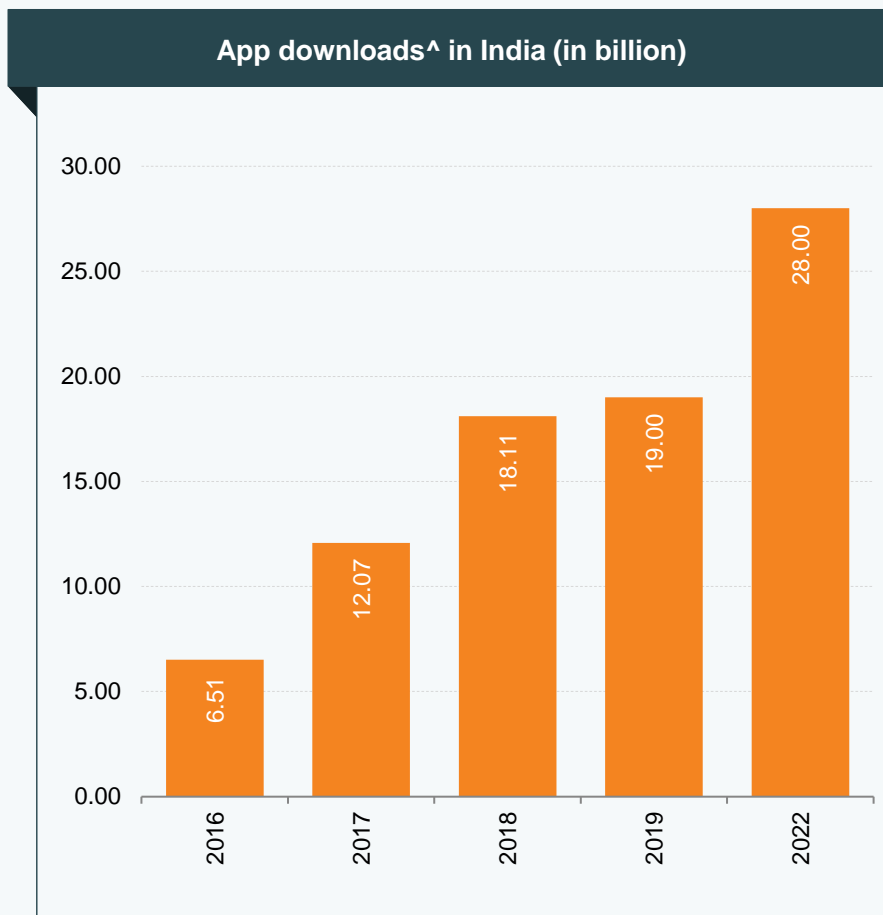
## 6. Telecom advertising market

- According to a Zenith Media survey, India is expected to become the fastest-growing telecom advertisement market, with an annual growth rate of 11% between 2020 and 2023.



# Mobile application market: fast-growing segment

- India was the second-largest market for Google Play in 2019 and was estimated to grow at a compound annual growth rate (CAGR) of 11% between 2018 to 2022.
- The Government of India intends to establish one hundred labs for creating applications using 5G services in engineering universities as part of the Union Budget 2023, in order to realize a new range of possibilities, business models, and job potential.
- Indians downloaded over 28 billion apps on their mobiles in 2022 and accounted for 5% of the 625 billion downloads globally.
- In 2020, India accounted for 14% of the global app installs.
- App downloads in the country increased from 12.07 billion in 2017 to 19.00 billion in 2019.
- Indian users spent around US\$ 370 million through app stores in 2019.
- The segment's growth is expected to be driven by increasing mobile connections and availability of low-range smartphones.
- Over 100 million apps are downloaded every month across different platforms such as iOS and Android.







**Notes:** F - Forecast, \*As per latest data available, ^Combined iOS App Store, Google Play and third-party android, Q1- Jan to March

**Source:** Gartner, Deloitte, Assorted News Articles, App Annie

# Key Industry Contacts



# Key industry contacts

Agency		Contact Information
	<p>Association of Unified Telecom Service Providers of India (AUSPI)</p>	<p>Address: B-601, Gauri Sadan 5, Hailey Road, New Delhi - 110 001, India            Tel: 91 11 23358585            Fax: 91 11 23327397            Website: <a href="http://www.auspi.in/">http://www.auspi.in/</a></p>
	<p>Association of Competitive Telecom Operators (ACTO)</p>	<p>Address: UGF-74, World Trade Centre, Babar Road, Connaught Place, New Delhi-110 001            Tel.: 91-11- 43565353/ 43575353/ 9899242273            Fax: 91 11 43515353            E-mail: info@acto.in, <a href="mailto:tapan@acto.in">tapan@acto.in</a>            Website: <a href="http://www.acto.in">www.acto.in</a></p>
	<p>Internet and Mobile Association of India (IAMAI)</p>	<p>Address: 232-B, Ground Floor, Okhla Industrial Estate, Phase III, New Delhi 110020            Tel: 91 11 46570328            E-mail: <a href="mailto:kalyan@iamai.in">kalyan@iamai.in</a>            Website: <a href="http://www.iamai.in">www.iamai.in</a></p>
	<p>Cellular Operators Association of India</p>	<p>Address: 14, Bhai Vir Singh Marg, Sector 4, Gole Market, New Delhi - 110001, India            Tel: 91 11 2334 9275            E-mail: <a href="mailto:contact@coai.in">contact@coai.in</a>            Website: <a href="http://www.coai.com">www.coai.com</a></p>



# Glossary

- BWA: Broadband Wireless Access
- CAGR: Compound Annual growth rate
- DoT: Department of Telecommunication
- FDI: Foreign Direct Investment
- FTTH: Fibre To The Home
- FY: Indian Financial Year (April to March)
- IMF: International Monetary Fund
- Rs.: Indian Rupee
- IPTV: Internet Protocol Television
- M&A: Mergers and Acquisitions
- MoU: Minutes of Use per month and per subscriber
- MPEG: Moving Picture Experts Group
- OFC: Optical Fibre Cable
- TRAI: Telecom Regulatory Authority of India
- USOF: Universal Service Obligation Fund
- US\$: US Dollar
- VAS: Value-Added Services
- WiMAX: Worldwide Interoperability for Microwave access telecommunications

Wherever applicable, numbers have been rounded off to the nearest whole number

# Exchange rates

Exchange Rates (Fiscal Year)

Year	Rs. Equivalent of one US\$
2004-05	44.95
2005-06	44.28
2006-07	45.29
2007-08	40.24
2008-09	45.91
2009-10	47.42
2010-11	45.58
2011-12	47.95
2012-13	54.45
2013-14	60.50
2014-15	61.15
2015-16	65.46
2016-17	67.09
2017-18	64.45
2018-19	69.89
2019-20	70.49
2020-21	73.20
2021-22	74.42
2022-23	78.60

Exchange Rates (Calendar Year)

Year	Rs. Equivalent of one US\$
2005	44.11
2006	45.33
2007	41.29
2008	43.42
2009	48.35
2010	45.74
2011	46.67
2012	53.49
2013	58.63
2014	61.03
2015	64.15
2016	67.21
2017	65.12
2018	68.36
2019	69.89
2020	74.18
2021	73.93
2022	79.82
2023	82.61
2024*	83.09

Note: \*- Until February 2024

Source: Foreign Exchange Dealers' Association of India

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